What Is Claimed Is:

1. An apparatus, comprising;

a voltage probe incorporated in a VLSI integrated circuit and coupled to a source of a local supply voltage, the voltage probe detectably emitting infrared radiation for probing instantaneous high-speed fluctuations of the local supply voltage in the integrated circuit, the radiation having an intensity that is related to a magnitude of the local supply voltage.

2. The apparatus of claim 1, wherein the voltage probe includes:

a MOSFET device having a gate, a source and a drain; and

a switching device coupled to the gate of the MOSFET device, the switching device selectively switching the MOSFET device to a saturated state during which the MOSFET device emits infrared radiation;

wherein the drain of the MOSFET device is coupled to the local supply voltage.

3. The apparatus of claim 1, wherein the voltage probe includes a decoupling capacitor.

4. An apparatus, comprising:

a MOSFET device having a gate, a source and a drain, the MOSFET device being incorporated in an integrated circuit and coupled via the drain to a local supply voltage, the MOSFET device detectably emitting infrared radiation for probing instantaneous high-speed fluctuations of the local supply voltage in the integrated circuit, the radiation having an intensity that is related to a magnitude of the local supply voltage; and

a switching device coupled to the gate of the MOSFET device, the switching device selectively switching the MOSFET device to a saturated state during which the MOSFET device emits infrared radiation.

5. The apparatus of claim 4, wherein the MOSFET device is an n-channel MOSFET.

6. The apparatus of claim 4, wherein the switching device includes a shift register element, the shift register element outputting a switching signal to the gate of the MOSFET device.

7. The apparatus of claim 6, further comprising:

a buffering device situated between and coupled to both the shift register element and the gate of the MOSFET device, the buffering device receiving the switching signal from the shift register element and buffering the switching signal before transmitting a buffered switching signal to the gate of the MOSFET device.

8. The apparatus of claim 7, wherein the MOSFET device is surrounded by a layout clearance area, the layout clearance area being devoid of active circuit components.

9. An apparatus, comprising:

a decoupling capacitor incorporated in an integrated circuit and coupled to a source of the local supply voltage, the decoupling capacitor detectably emitting infrared radiation for probing instantaneous high-speed fluctuations of a local supply voltage in the integrated circuit, the radiation having an intensity that is related to a magnitude of the local supply voltage.

10. The apparatus of claim 9, wherein the decoupling capacitor includes a polysilicon layer, a gate oxide layer having a first side situated adjacent to the polysilicon layer, and a further silicon layer situated adjacent to a second side of the gate oxide layer, the local supply voltage being coupled to the polysilicon layer.

11. A method for probing instantaneous high-speed fluctuations of a local supply voltage in a VLSI integrated circuit, the method comprising:

emitting infrared radiation using a local voltage probe, the radiation having an intensity that is related to a magnitude of the local supply voltage;

initiating digital activity by running a repetitive pattern through circuitry in the vicinity of the local voltage probe, the repetitive pattern stimulating local supply voltage fluctuation events;

sampling emitted radiation intensity using time correlated photon counting;

and

determining local supply voltage fluctuation as a function of the sampled emitted radiation intensity;

wherein the sample times are synchronized to a clock cycle of the integrated circuit.

12. The method of claim 11, further comprising:

if no measurements have yet been taken using the voltage probe at a vicinity,

taking initial measurement of emitted radiation intensity for a range of local supply voltages while digital activity is suspended in a vicinity of the local voltage probe; and

compiling a calibration table in which measured intensity values are correlated with respective magnitudes of the local supply voltage.

13. The method of claim 12, wherein the initial measurements are taken in a range of from 70 percent to 120 percent of a regular supply voltage.

14. The method of claim 11, wherein the local voltage probe includes a MOSFET device for infrared emission.

15. The method of claim 11, wherein the local voltage probe includes a decoupling capacitor for infrared emission.

16. The method of claim 11, further comprising:

detecting a series of samples of emitted radiation, each successive sample being taken for a single repetition of the repetitive pattern during a time interval correlated with the repetitive pattern;

repeating the recordation of a series of samples for numerous iterations; and

totaling the samples detected for each time interval.

17. The method of claim 11, wherein measurements of emitted radiation intensity are made using a time resolved emission system.

18. The method of claim 14, further comprising:

inputting a tap pattern to turn the MOSFET device ON into a saturated state.